REMARKS

SPECIFICATION

Applicants would like to thank the Examiner for pointing out the informalities in paragraph 1 regarding failure to mention the completed patent stemming from the parent application. Appropriate amendments have been entered above.

During review of the application, applicants realized that the calculated values for rotor peripheral velocity in Example 8, paragraph [0139] were incorrect. The rotor speed was stated to be 138 revolutions per minute, and the radius to the rotor impeller tips was 7 ½ inches, with an effective rotor diameter of 15 inches. Thus, the rotor peripheral speed should have been stated as:

138 rev/min. x 15 inches x π x 1 / 12 inches/foot = 542 feet / minute, or

542 feet / minute x 60 minutes / hour x 1 / 5280 feet / mile = 6.16 miles / hour.

In order to achieve consistency with the measured values, applicants respectfully request correction of these values as shown in the amended paragraph.

NEW CLAIMS 42 – 45 (Examiner's Suggestions)

Applicants wish to thank the Examiner for the evident care he has shown in examining the application and appreciate his suggestion that claim 6 would be allowable if rewritten in independent form including all of the limitations of claim 2. Accordingly, new claim 42 combines claims 2 and 6. Although the portion from claim 6 is not identical to that original claim, applicants believe claim 42 is allowable. New claim 43 dependent on claim 42 was added.

Similarly, applicants appreciate the Examiner's suggestion that claims 25-26 be consolidated with claim 2 to form allowable claims. Thus, claim 25 was combined with claim 2 to form new allowable independent claim 44. Claim 26 was modified to form new claim 45 dependent on claim 44.

REJECTED CLAIMS

With regard to claims 2-5, 7-14, 19-20, and 24 which were rejected under 35 USC 102 as anticipated by Kobayashi (5,848,521, cited by applicants), applicants respectfully traverse these rejections. However, claim 2 is being amended to more clearly distinguish applicants' invention from Kobayashi. Claim 2 as amended distinguishes over Kobayashi in the following five points:

A. "a collector rotor assembly comprising ... impeller elements being adapted to ... impel said yard debris toward said duct entrance." Kobayashi's brush is not adapted to impel yard debris toward the duct entrance, because it turns far too slowly to be effective.

B. "a collector rotor assembly comprising: ...a plurality of impeller elements ... being adapted to: i. engage and sweep over said surface..." The Kobayashi apparatus has its front wheels mounted on the brush shaft, and the height of the brush tips above the surface to be cleaned is therefore not adjustable. Thus, this brush is not adapted for engaging, and accordingly sweeping, the surface under the many different conditions that will be encountered (differing grass length, smaller debris objects on non-grassy areas, brush tip wear, etc.), in which adjustment of the height of the

brush above the surface will be necessary. Thus, applicants submit that amended claim 2 distinguishes over Kobayashi and should be allowable.

C. "a shredder blower unit...adapted to: i. provide suction at said entrance of said first duct;" Since Kobayashi teaches a *de facto* closed system, his apparatus takes in little or no air at the duct entrance, and would not have substantial suction at the entrance to the first duct. Again, applicants submit that claim 2 distinguishes over Kobayashi and should be allowable.

D. "an air-solids separator means disposed at said exit to said second duct for separating said reduced yard debris in said flow of air induced by said shredder blower into a debris-enriched stream and a debris-depleted stream;" It is noted that Kobayashi does not include any working examples. In contrast, the present application is replete with detailed examples of full-scale working models. In the absence of data demonstrating otherwise, there is no reason to think that, if ever constructed, the Kobayashi separator would work effectively, as it omits the baffle found to be critical to successful operation. In fact, Kobayashi (column 6, lines 27-30) even hints the separator does not work well: "...a screen can be used with coarser mesh than that of a conventional collector, minimizing clogging of the screen in the present invention." Thus, he purposefully allows more solid material to pass through the screen. However, if in this closed system he allows more solids to pass through the screen, one has to wonder at what point the recycle load will become unsustainable for the system. Another issue is whether the fact

that the separator does not having a baffle will allow coarse objects to build up on the screen and clog the screen. The remaining issue is that the upper end of the air transportation duct passes through the cylindrical chamber, resulting in probable flow restriction, turbulence, and debris build-up in the space where Kobayashi suggests that separation will occur. The result of these interferences is that they would disturb the swirling flow needed for successful separation. In the absence of effective separation with the Kobayashi apparatus as disclosed, applicants' claim 2 distinguishes over Kobayashi and should be allowable.

E. "means for discharging said debris-depleted stream to the atmosphere" Kobayashi specifically teaches that "The air from the scattered objects collection vessel is not released to the outside of the body..." (column 6 lines 27-28). Thus, applicants' claim 2 as amended clearly distinguishes over Kobayashi and should be allowable.

These points will now be discussed in more detail.

1. HYPOTHETICAL KOBAYASHI MACHINE

Analysis of the Kobayashi patent strongly suggests that the design is speculative, and that the machine was almost certainly never built; at least not in the configuration shown in the patent. Instead, anyone attempting to construct Kobayashi's machine would need to incorporate multiple modifications reflected in applicants' claims in order for the machine to work satisfactorily. In particular:

a. As will be discussed below in relation to applicants' independent claim 2, Kobayashi's hypothetical design includes: (1) a slow-turning brush that would not impel leaves and other debris toward the intake duct; (2) a closed airflow system (he says no release of air "to the outside of the body") that results in little or no incoming air flow at the entrance to the intake duct, and therefore, "meager," if any, vacuuming action adjacent to the surface to be cleaned; and (3) a large intake duct with a slow-moving air stream at best – insufficient velocity for entraining very many leaves. By contrast, applicants' extensive experiments showed that a much higher impeller speed was essential, and they went to great effort to maximize incoming airflow at the intake duct entrance to achieve sufficient "suction" and vacuuming action. The point is that if a machine like the one taught by Kobayashi were constructed, minimal leaf collection would occur.

b. Kobayashi's forward idler wheels 14 are mounted on the brush drive shaft 21 (column 3, lines 41 – 43). This speculative design means that the clearance of the brush tips 22 above the ground or lawn surface is not adjustable for varying conditions, such as different lengths of grass, sweeping fine materials such as nuts and shells from smooth surfaces, or even wear of the brush bristles. Applicants' experience with their machine showed the clear need for height adjustment of the collector rotor assembly above the surface, and an adjustable roller (47 in Fig 1, [0098]) was included for this purpose. New claim 40 covering this feature has been added.

c. The swirling motion in Kobayashi's cylindrical chamber 41 would be substantially impeded if not totally blocked by the upper end 45a of the air transportation duct, which passes through the side wall of the cylindrical collection section 42, through the cylindrical guide 43, and therefore, through the cylindrical chamber 41. Thus, the cyclone effect for separating the scattered objects from the transporting air would be substantially hindered by the presence of this duct. Certainly, this design was never verified by actually constructing and operating such a separator. Please note that in applicant's drawings the debris-depleted air passes outward through the top of the separation chamber and does not interfere with the cyclone effect in the separation chamber.

d. Kobayashi's brush shaft 21 is driven by a chain 17 from the rear wheels 13 (Column 5 lines 28-35), meaning that the brush does not turn if the rear wheels are not turning. Certainly, this machine is hypothetical, because a brush on a real machine will occasionally get jammed with leaves, and the machine will need to stand in one place for a time with the brush turning to clear the leaf jam. Applicants' collector rotor assembly is driven independently of the wheels.

e. If Kobayashi's machine were actually built as designed in Figure 2, the movable cutters 35 would strike the rearward wall of the fan casing 31 with major impact, causing either jamming or rapid breakage. This damage would occur because the rearward wall of the casing 31 is located substantially closer to the drive shaft 32a than is the forward wall 31b.

In summary, Kobayashi's design is hypothetical and would not enable one skilled in the art to construct a machine that would effectively collect leaves and other yard debris as taught and claimed by the applicants. In contrast, applicants clearly have a machine that functions very well.

2. CLAIM 2

The leaf collector of applicants' invention provides

"e. a collector rotor assembly comprising: a collector rotor body disposed at the entrance to said first duct having a substantially horizontal axis of rotation generally normal to said first direction; and a plurality of impeller elements mounted upon said collector rotor body, said impeller elements being adapted to:

i. sweep over said surface,

ii. collect yard debris thereupon, and

iii. impel said yard debris toward said duct entrance,...

g. a shredder blower unit, disposed between said exit to said first duct and said entrance to said second duct, adapted to:

i. provide suction at said entrance of said first duct;

ii. induce a flow of air through said first and second ducts; and

iii. reduce yard debris entrained in said flow of air as it passes through said shredder blower unit."

Applicants' extremely detailed specification provides numerous detailed working examples describing the conditions that must be met for the impellers to be effective in collecting and impelling the leaves and debris toward the duct entrance.

Specifically, Example 8 teaches that when the rotor peripheral velocity is 6.16 miles per hour (mph), the collector rotor assembly achieves adequate collection of leaves and other debris. Example 4 demonstrates that with a higher rotor peripheral velocity of 12.3 mph, the collector provides excellent collection results. In contrast, Example 3 shows that when the rotor turned at 65 revolutions per minute (with a rotor peripheral velocity of only 2.9 mph), the collector was marginally effective at best. (Note: Calculations of rotor peripheral velocities are shown on page 36 of the Appendix.)

In contrast, the Kobayashi brush peripheral velocity can be calculated as shown on page 36 of the Appendix to be about 1.9 mph (for a machine forward speed of 1.0 mph), which is much less than the 2.9 mph shown to be marginally effective at best in Example 3. Accordingly, it is abundantly clear that the Kobayashi device fails to provide an adequate impeller speed to be adapted to impel yard debris toward the duct entrance, and therefore, Kobayashi fails to meet the limitation of claim 2. Further, nothing in Kobayashi in any way suggests that the difference between an impeller speed of 1.9 mph and 2.9 mph would make the difference between success and failure, or even that impeller speed would be a critical factor in determining the effectiveness of the collector.

It appears that Kobayashi is largely focused on the concept of recycling air from the separator to the guide cover 23 of the raking portion 20 (column 5 lines 14-15), rather than on the important parameters which must be addressed for a machine of

this type to operate effectively. This comparison of impeller performance and air flows further bears out the assessment above that the Kobayashi device was never constructed. Furthermore, the claimed apparatus of applicants' invention is extremely effective in leaf collection and clearly distinguishes over the Kobayashi patent. Accordingly, claim 2 should be allowable in its amended form.

3. NEW CLAIMS 46, 47, AND 48

Although Kobayashi does not address airflow velocities and volumes necessary for his apparatus to function, he may have speculated that air flowing into the intake duct [comprised of "cylindrical lower transportation cover 24 integral with the guide cover 23" (column 3 lines 50-51) leading to suction spout 31c] might be adequate to create vacuuming action under and behind the brush. However, he teaches and claims what amounts to a closed airflow system in which "air from the scattered objects collection vessel is not released to the outside of the body" (Column 6 lines 27-28), but instead "the discharged air immediately is induced again by the induction fan 30" (column 5 lines 24-25) after being directed from the air discharge spout 45b toward the suction spout 31c. Hence in Kobayashi, little fresh air can be taken into the system at the entrance to the intake duct near the surface of the ground, and there would be little or no "suction at said entrance of said first duct" as claimed by the applicants. Instead, the intent in Kobayashi's design appears to be one of having the air from the air discharge spout 45b flow directly ("short circuit") to the adjacent suction spout 31c and not flow around the lower extremities of the brush. Since there would be only minimal fresh air or recycled air flowing adjacent the ground and into the intake duct, then very little vacuuming action ("suction at

said entrance of said first duct") could occur to pick up leaves and other scattered objects. Furthermore, the intake duct appears to have a large cross section, which means that any meager volume of air which might be taken in at its entrance would have such low flow velocity that it would not be effective in entraining leaves and other scattered objects and transporting them to the induction fan.

A further point is that since Kobayashi shows substantial clearance between the brush tips and the guide cover 23 in Fig. 2, there would be little restriction of airflow from the discharge spout 45b to the suction spout 31c. Even if the brush tips passed close to the upper housing, the apparent wide spaces between the brush clumps evident in Fig. 1 would still permit relatively unrestricted flow of air through the volume occupied by the rotating brush. Again, the result of these factors is that very little of the air going into the suction spout 31c would flow close to the ground surface where vacuuming action could be achieved.

By contrast, in new claim 46 applicants claim a collector rotor assembly comprising a substantially gas-impervious impediment to unrestricted flow of air "into said first duct..." Also, in new claim 47 dependent on claim 46, a housing means for limiting the flow of air between the housing means and the collector rotor assembly is provided. These restrictions induce greater flow of air along the ground surface and enhance the vacuuming effect.

Furthermore, when the enhanced vacuuming effect and the true impelling capability

of applicants' collector rotor discussed in 1. above are combined in one machine, a truly effective machine is achieved, as in new claim 48. Thus, applicants submit that new claims 46, 47, and 48 also distinguish applicants' invention over Kobayashi and should be allowable.

4. CLAIMS 14 AND 49

Applicants respectfully submit that Kobayashi's separator does not include a baffle disposed between the separation chamber and the accumulation chamber as taught by applicants in claim 14.

Kobayashi states in column 4, lines 54-65: "The upper end of the scattered objects transportation duct 46 is connected to the upper peripheral portion of the cylindrical chamber 41 such that the upper portion of the scattered objects transportation duct 46 directs in a tangential direction of the upper inner portion of the cylindrical chamber 41, and the mixture of the scattered objects and the transporting air which is introduced in the cylindrical chamber 41 through the scattered objects transportation duct 46 generates a swirl in the scattered objects collection vessel 40 about the cylindrical guide 43, providing a cyclone effect to separate the scattered objects from the transporting air." The scattered objects are retained in the collection section 42.

One might be able to make the cylindrical chamber 41 between the outside wall of the collecting vessel 40 and the cylindrical guide 43 comparable to applicants' separation chamber. However, the dust collection screen 44 cited by the Examiner

as a "baffle" would not function as a baffle, because Kobayashi indicates that air flows through it (column 5 lines2-4). He also indicates that one can use a screen with "coarser mesh than that of a conventional collector, minimizing clogging of the screen..." (column 6 lines 28-30), implying that both air and solid materials will pass through the screen. Furthermore, the screen does not extend laterally outside the cylindrical guide 43 to constitute a baffle between the cylindrical chamber 41 (similar to applicant's separation chamber) and the collection section 42 (comparable to applicants' accumulation chamber).

Please note that these distinctions are similar to those discussed in the 28 April 2003 interview with the Examiner regarding Parkes and Bryant as the distinctions pertained to Application No. 10/045,123, leading to Patent No. 6,658,833.

Thus, applicants submit that the screen disclosed by Kobayashi does not comprise the baffle claimed by the applicants, and that claim 14 should be allowable, especially when structured as a claim dependent on amended claim 2. Applicants further submit that from the reasoning above, the baffle of independent claim 49 distinguishes over Kobayashi, and claim 49 should be allowable.

5. CLAIMS 7 AND 9

Applicants submit that amended claim 2 is allowable, and that claim 7 dependent on claim 2 should also be allowable, even though the current amendment now removes a previous restriction in claim 7. Claim 9 is currently amended to simply correct informalities.

AMENDED CLAIMS 25 AND 26

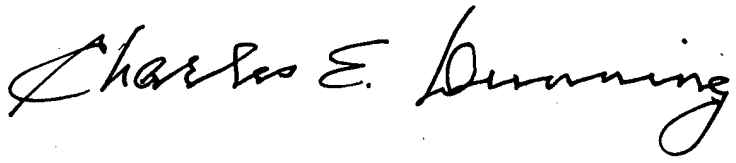
With claim 2 now believed to be allowable, claims 25 and 26 dependent on claim 2 are retained, but are amended to achieve greater clarity.

PAYMENT

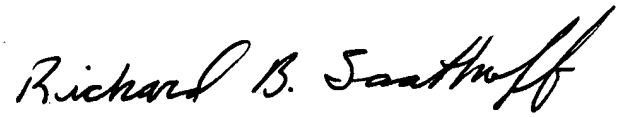
With the original application having 26 total claims including 3 independent claims, applicants paid an examination fee of $385 plus 6 x $9 = $54 for the 6 patents over 20, for a total of $439 (Small Entity status). Through a preliminary amendment, the number of claims was reduced to a total of 18, including 1 independent claim, all of which were examined. The current response cancels one of the existing claims, and adds 10 new claims, including 5 new independent claims. Thus, a total of 27 claims are currently active, including 6 independent claims. In a call to the Inventor Service Center (11-15-05), applicant learned that there is still a $54 credit for the 6 claims over 20, which were paid for but then canceled before examination. Applicant understood from the phone conversation that the current amount due is $400 (3 x $100 for the independent claims over 3, plus 4 x $25 based on the total number of claims). A check in the amount of $400 is enclosed. If this amount is incorrect, please so inform the applicants.

In view of the foregoing amendments and remarks, this application is believed to be in condition for allowance. If the applicants have overlooked any matters, the Examiner is invited to call the number listed below.

Respectfully submitted,



Charles E. Dunning, and



Richard B. Saathoff,

Applicants

810 Grant Place

Neenah, Wisconsin 54956-2924

Telephone: 920-725-5256

Facsimile: 920-725-0071

Cell Phone: 920-858-6338

Email: dunningc@tds.net

November 15, 2005